

having a particle size less than about 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^- , CN^- , $Cr_2O_7^{2-}$, WO_4^{2-} , $[Fe(CN)_6]^{3-}$, oxalate, citrate and anions of 1-phenyl-5mercaptotetrazole, 2-mercapto-benzothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds; and

(b) means for writing data in digital form on said material.

56. The digital optical memory device of claim 55, wherein the means for writing comprises a two-laser system for two-photon writing.

57. The memory device of claim 55, wherein the two-laser system comprises means for two-photon writing of the data in a three-dimensional optical matrix in said material.

58. A digital optical memory device comprising:

(a) a digital optical memory medium comprising a plurality of layers of a luminescent material for an optical digital memory device, each of said plurality of layers comprising insoluble microparticles dispersed in a water soluble polymer, said microparticles having a particle size less than about 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and

quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^- , CN^- , $\text{Cr}_2\text{O}_7^{2-}$, WO_4^{2-} , $[\text{Fe}(\text{CN})_6]^{3-}$, oxalate, citrate and anions of 1-phenyl-5mercaptotetrazole, 2-mercapto-benzothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds, at least one of said plurality of layers having data stored in digital form therein; and

(b) means for reading said data in said digital form from said material.

59. A method of reading digital data comprising:

(a) providing a digital optical memory medium, the medium comprising a plurality of layers of a luminescent material for an optical digital memory device, each of said plurality of layers comprising insoluble microparticles dispersed in a water soluble polymer, said microparticles having a particle size less than about 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver by an oxidizer selected from the group consisting of $\text{K}_3[\text{Fe}(\text{CN})_6]$, $(\text{NH}_4)_2\text{S}_2\text{O}_8$, KMnO_4 , CuCl_2 , FeCl_3 and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^- , CN^- , $\text{Cr}_2\text{O}_7^{2-}$, WO_4^{2-} , $[\text{Fe}(\text{CN})_6]^{3-}$, oxalate, citrate and anions of 1-phenyl-5mercaptotetrazole, 2-mercapto-benzothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds, at least one of said plurality of layers having data stored in digital form therein; and

(b) reading said data in said digital form from said material.

60. A method of forming a digital optical memory medium, the method comprising:

simultaneously extruding, from a multi-slit filler, thin layers of photographic emulsion and between them thick layers of a silver halide free polymer to a substrate to form a multi-layer material;

exposing said multi-layer material to light,

developing and fixation of said multi-layer material to form silver particles from the exposed silver halide;

oxidation of the silver particles to form the insoluble salt particles by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, said oxidation being carried out in a presence of anions selected from the group consisting of SCN^- , CN^- , $Cr_2O_7^{2-}$, WO_4^{2-} , $[Fe(CN)_6]^{3-}$, oxalate, citrate and anions of 1-phenyl-5-mercaptotetrazole, 2-mercapto-benzothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds;

treating the multi-layer material with luminescing dye and allowing the luminescing dye to be sorbed onto the particles; and

writing data in digital form onto said medium. - -

REMARKS

This amendment cancels all the originally filed claims 1 - 54 in the parent application, Serial No. 09/028,932. In their stead, claims 55-60 are presented featuring a digital optical memory medium comprising a plurality of layers. These claims were presented as Claims 63, 64, 65, 66, 70 and 71 in an amendment filed on May 30, 2001 in the parent application.